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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/791,295

03/03/2004

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EXAMINER

ARENA, ANDREW OWENS

ART UNIT

PAPER NUMBER

2811

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/791,295	<b>Applicant(s)</b> SUEHIRO ET AL.	
	<b>Examiner</b> Andrew O. Arena	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 46-51 and 53-64 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 46-51 and 53-64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

The arguments filed 5/7/2009 were fully considered but are not persuasive.

The arguments that “nowhere do the cited references teach or suggest...an inner surface of the phosphor layer portion...conforms to a shape...of said recess” (pg 9 ¶3) are not convincing since several cited references include this feature.

Most importantly, the reference relied upon for rejection, Soules, shows: in Fig 1, phosphor layer 14 whose inner surface (boundary with 12) has a roughly-rectangular cross-section, which “conforms to a shape” of the recess (16 boundary with 14), which is also roughly-rectangular; in Fig 3, phosphor layer 34 having the exact same inner surface shape as the inner surface shape of lens 36.

Other references of already record include this feature: Juestel (JP 2002-223008) shows in Drawing 1 (¶24) phosphor layer 2 and recess in lens 6 having same shape; Lowery (US 5,959,316) shows in Fig 4 (col 3 ln 18-33) phosphor layer and recess in 68 with same shape and describes advantages to uniform phosphor layer thickness.

Newly cited references also disclose this feature: Miller (US 6,155,699) shows in Fig 2 phosphor layer 36 with a uniform thickness having the same shape as the recess in lens 22; Taskar (US 6,734,465) shows in the bottom right of Figs 2-4 and 7 the phosphor layer 13 having an inner surface of the same rectangular shape as the lens.

The instant invention arguably differs from the art in the forming method, e.g., applying the phosphor layer to the recess. However, the resultant structure is shown in the art; said method cannot distinguish these apparatus claims. See MPEP § 2113.

***Claim Rejections - 35 USC § 102***

Claims 46-48, 51-55, 59, 62 and 63 are rejected under 35 U.S.C. § 102(b) as being anticipated by Soules (US 6,252,254).

**RE claim 46**, Soules discloses a light emitting apparatus (col 3 ln 46) comprising:  
a semiconductor light-emitting element (12, col 3ln 47) that emits light with a predetermined wavelength (col 3 ln 57-61); and

an external lens (16, col 3 ln 49) having a light convergence shape to converge light emitted from the light-emitting element, said external lens comprising:

a recess to house the semiconductor light-emitting element, said recess including an upper (horizontal) surface formed over said light-emitting element and side (vertical) surface which is substantially perpendicular to said upper surface (Fig 1); and

a phosphor layer portion (14, col 3 ln 47-48) that has a substantially uniform thickness and is conformally formed on said upper and side surfaces of the recess such that an inner surface of the phosphor layer portion has a shape which substantially conforms to a shape of said upper and side surfaces of said recess, the phosphor layer portion including a phosphor to be excited by irradiating light emitted from the semiconductor light-emitting element (col 4 ln 2-3),

wherein the upper and side surfaces of the recess are closely disposed surrounding the light-emitting element such that the light convergence shape “converges light radiated from the phosphor layer portion into a spot of light” (Soules discloses structure required by functional recitation of apparatus claim, MPEP § 2114).

**RE claim 47**, Soules discloses a light emitting element(12) comprises a flip-chip type light emitting diode (one of ordinary skill appreciates that Soules shows connections on opposite side of emission, which is a “flip chip”) that emits light that emits light from its light emission surface located opposite side of its mounting surface.

**RE claim 48**, Soules discloses the recess is located close to the semiconductor light-emitting element along the profile of the semiconductor light-emitting element.

**RE claim 51**, Soules discloses the phosphor layer portion is formed on an entire surface of the recess.

**RE claim 53**, Soules discloses a horizontal cross section of the recess comprises one of a circular shape and a rectangular shape.

**RE claim 54**, Soules discloses an electrode (inherent in functioning device), said light emitting element being formed on said electrode, and said external lens being affixed to said electrode by a sealant (14) formed on said light- emitting element.

**RE claim 55**, Soules discloses said external lens comprises a convex portion and a bottom surface which is formed opposite convex portion and includes said recess.

**RE claim 59**, Soules discloses said semiconductor light-emitting element is mounted on an electrode (wires shown at bottom of Fig 1) and said external lens is mounted on said electrode (“mounted on” interpreted to mean “in contact with”), and

wherein the recess includes a rectangular-shaped horizontal cross-section and said upper surface comprises a planar surface which is formed opposite a light-emitting surface of said light-emitting element, such that the recess is closely disposed

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surrounding the light-emitting element and the light convergence shape converges light radiated from the phosphor layer portion into a spot of light.

**RE claim 60**, Soules discloses light emitted from said light-emitting surface is incident on said light convergence shape of said lens via said planar surface of recess.

**RE claim 62**, Soules discloses a light-emitting apparatus, comprising:

a semiconductor light-emitting element (12, col 3ln 47) that emits light with a predetermined wavelength (col 3 ln 57-61); and

an external lens (16, col 3 ln 49) mounted over said semiconductor light-emitting element and having a light convergence shape to converge light emitted from the semiconductor light-emitting element, a recess being formed in said external lens to house the semiconductor light-emitting element, said recess including a upper (horizontal) surface formed over said semiconductor light-emitting element and a side (vertical) surface which is substantially perpendicular to said upper surface; and

a phosphor coating (14, col 3 ln 47-48) having a substantially uniform thickness and being conformally formed on said upper and side surfaces of the recess such that an inner surface of said phosphor coating has a shape which substantially conforms to a shape of said upper and side surfaces of said recess (Fig 1),

said phosphor coating comprising a phosphor to be excited by irradiating light emitted from the semiconductor light- emitting element (col 4 ln 2-3),

wherein the inner surface of said phosphor coating is closely disposed surrounding the light-emitting element such that the light convergence shape converges light radiated from the phosphor layer portion into a spot of light (MPEP § 2114).

**RE claim 63**, Soules discloses said external lens comprises all structure required by the recitation “injection-molded lens” per MPEP § 2113.

***Claim Rejections - 35 USC § 103***

Claims 49 and 50 are rejected under 35 U.S.C. § 103(a) as being obvious over Soules as applied to claim 46, in view of Roberts (US 6,335,548).

**RE claims 49 & 50**, Soules differs from the claimed invention only in not disclosing a plurality of light-emitting diodes.

Roberts is analogously directed to a light emitting apparatus comprising a semiconductor light emitting element and discloses (e.g., Fig 19) said element comprises a plurality of light-emitting diode (LED) elements (1909-1911, col 29 ln 65) which have different emission wavelength (col 30 ln 11-14) which are disposed in a predetermined arrangement; allowing “light of any color desired” (col 30 ln 18-20).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Roberts such that the semiconductor light-emitting element comprises a plurality of light-emitting diode (LED) elements which have different emission wavelengths and are disposed in a predetermined arrangement; at least to allow light of any color desired.

Claims 56-58 and 64-65 are rejected under 35 U.S.C. § 103(a) as being obvious over Soules as respectively for claims 55 and 63, in view of Chen (US 6,531,328).

**RE claim 56**, Soules discloses a mounting (inherent in functional device).

Soules differs from the claimed invention only in not explicitly showing the mounting details.

Chen is analogously directed to a light emitting apparatus (e.g., Fig 18) comprising a semiconductor light emitting element (3, col 5 ln 24 & 30), mounted on a wiring pattern (17, 18) formed on a surface of a submount (8) formed on a concave portion of an electrode.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that said mounting comprise a submount formed on a concave portion of said electrode, a wiring pattern being formed on a surface of said submount and said light-emitting element being mounted on said wiring pattern; at least to use a known suitable mounting arrangement.

**RE claim 57**, Soules in view of Chen discloses said electrode comprises a plurality of leads, and said submount is formed on said plurality of leads.

**RE claim 58**, Soules discloses (Fig 3) a gap is formed between said inner surface of said phosphor layer portion (34) and said light-emitting element (32), said sealant (38) filling said gap.

**RE claims 64 & 65**, Soules differs from the claimed invention only in not disclosing the lead and positioning member as required by claim 65.

Chen is analogously directed to a light emitting apparatus (e.g., Fig 18) comprising an external lens 23 positioned over a semiconductor light emitting element (3, col 5 ln 24 & 30) and mounted to a lead (16) wherein a convex portion of said lens (portion below the upper surface of 16) engages with a concave of the lead (Fig 18).



It would have been obvious to a person having ordinary skill in the art at the time the invention was made that said mounting comprise a lead, said external lens being mounted on said lead, wherein said external lens comprises a positioning member for positioning said external lens on said lead over said semiconductor light-emitting element wherein said positioning member comprises a convex portion which is engaged with a concave portion of said lead; at least for a known suitable arrangement with predictable results.

Claim 61 is rejected under 35 U.S.C. § 103(a) as obvious over Soules and Chen.

**RE claim 61**, Soules discloses a light-emitting apparatus, comprising (Fig 1):

an electrode (wires at bottom of Fig 1);

a semiconductor light-emitting element (12, col 3ln 47) that has a rectangular-shaped horizontal cross-section and is on said electrode and emits light with a predetermined wavelength (col 3 ln 57-61); and

an "injection-molded" (or the structure implied thereby per MPEP § 2113) external lens (16, col 3 ln 49) comprising:

a planar surface (bottom) which could be mounted;

a light convergence shape formed on a side of said external lens which is opposite the planar surface, for converging light emitted from the light-emitting element;

a recess formed in said planar surface of said lens, said recess including an upper (horizontal) surface formed over said light emitting element and a side (vertical) surface which is substantially perpendicular to said upper surface; and

a phosphor layer portion (14, col 3 ln 47-48) that has a substantially uniform, thickness, and is conformally formed over said upper and side surfaces of the recess such that an inner surface of said phosphor layer portion has a shape which substantially conforms to a shape of said upper and side surfaces of said recess, the phosphor layer portion including a phosphor to be excited by irradiating light emitted from the semiconductor light-emitting element; and

a sealing resin (38 in Fig 3, col 7 ln 11-14) formed in said recess between said light-emitting element and said phosphor layer portion, which seals said light-emitting element and bonds said external lens to said electrode.

Soules differs from the claimed invention only in not disclosing the mounting details (flip-chip mounted to electrode on a lead, concave electrode for convex lens).

Chen is analogously directed to a light emitting apparatus (e.g., Fig 18) and comprises an electrode (16, 17, 18, col 5 ln 10) formed on a surface of a lead, the LED (3) flip-chip mounted to said electrode, and a lens (23) with a planar surface mounted to a planar surface of said electrode thereby forming a housing for the LED.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that said electrode be on a surface of a lead and said light-emitting element be flip-chip mounted to said electrode and that said lens have a planar surface bonded to the planar surface of the electrode; at least for a known suitable housing with predictable results.

***Conclusion***

Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of time extension per 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571- 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more info about PAIR, see <http://pair-direct.uspto.gov>. For questions PAIR access, contact the Electronic Business Center at 866-217-9197 (toll-free). For assistance from a USPTO Customer Service Rep or access to the automated info system, call 800-786-9199 or 571-272-1000.

/Andrew O. Arena/  
Examiner, Art Unit 2811  
30 July 2009

/Lynne A. Gurley/  
Supervisory Patent Examiner, Art  
Unit 2811